"Apparatus for Cooling and Refrigerating Liquids." FIG. 1.

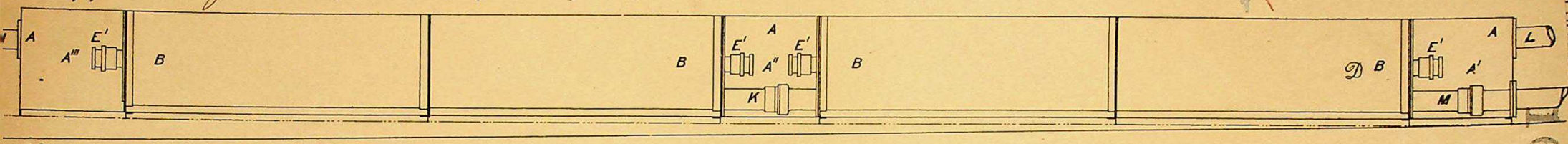
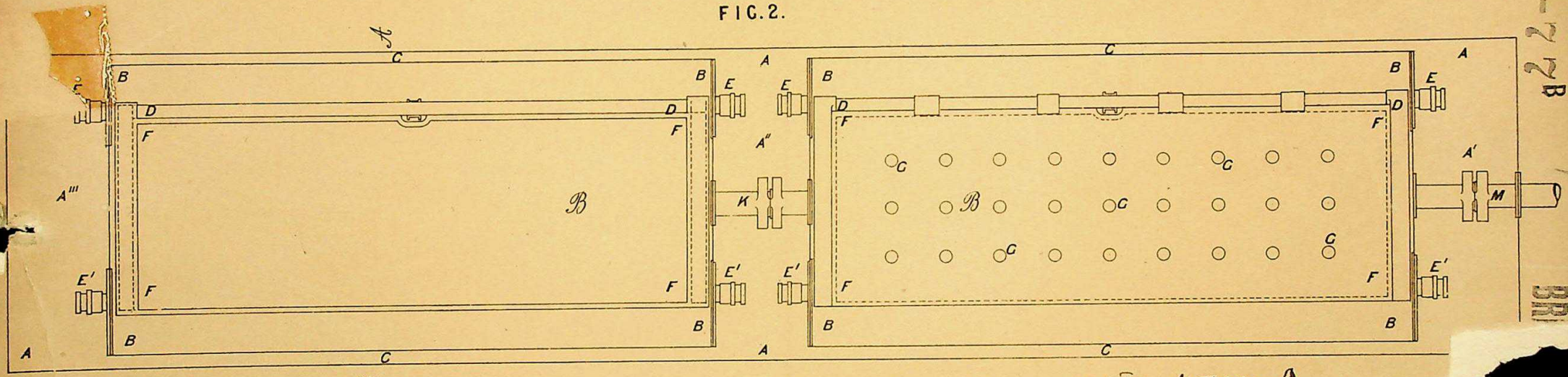


FIG. 2.



cold water in outer pans A
" inner pans B.

FIG. 3.

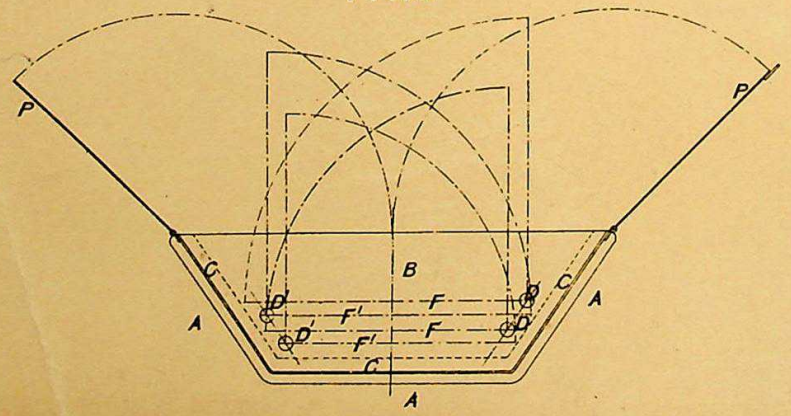
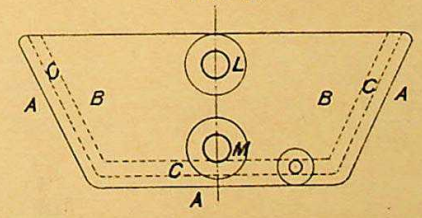


FIG. 4.



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62. REFRIGERATION.
Refrigerator Cars

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HOCKING'S Specification.

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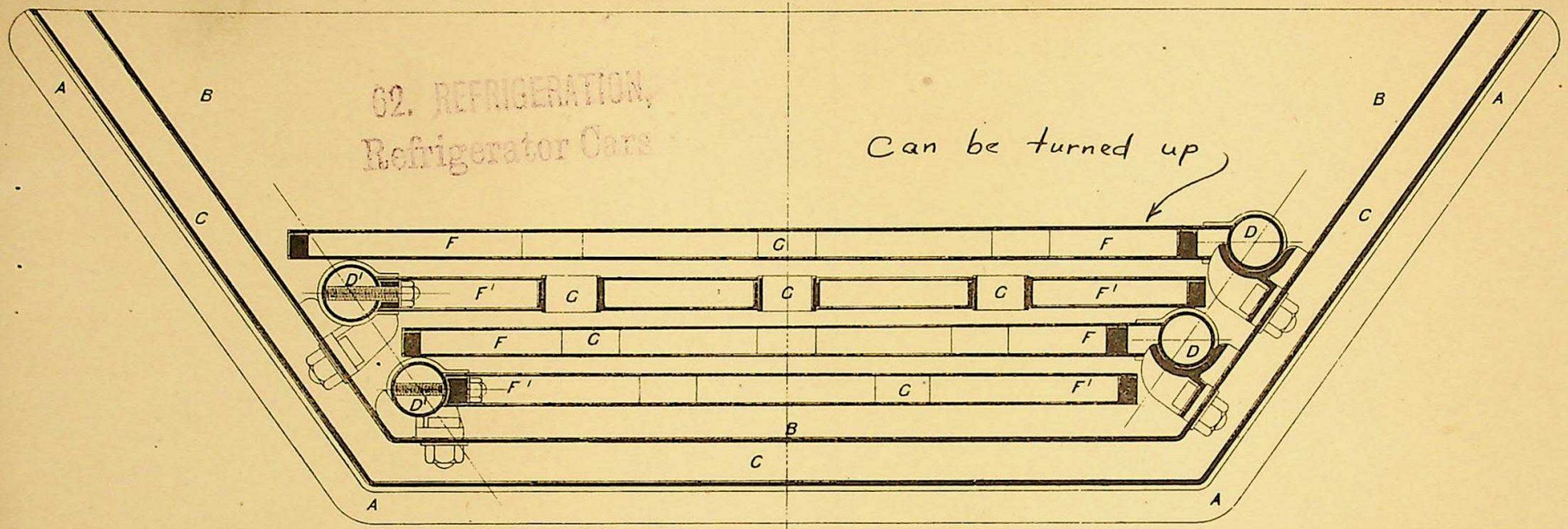
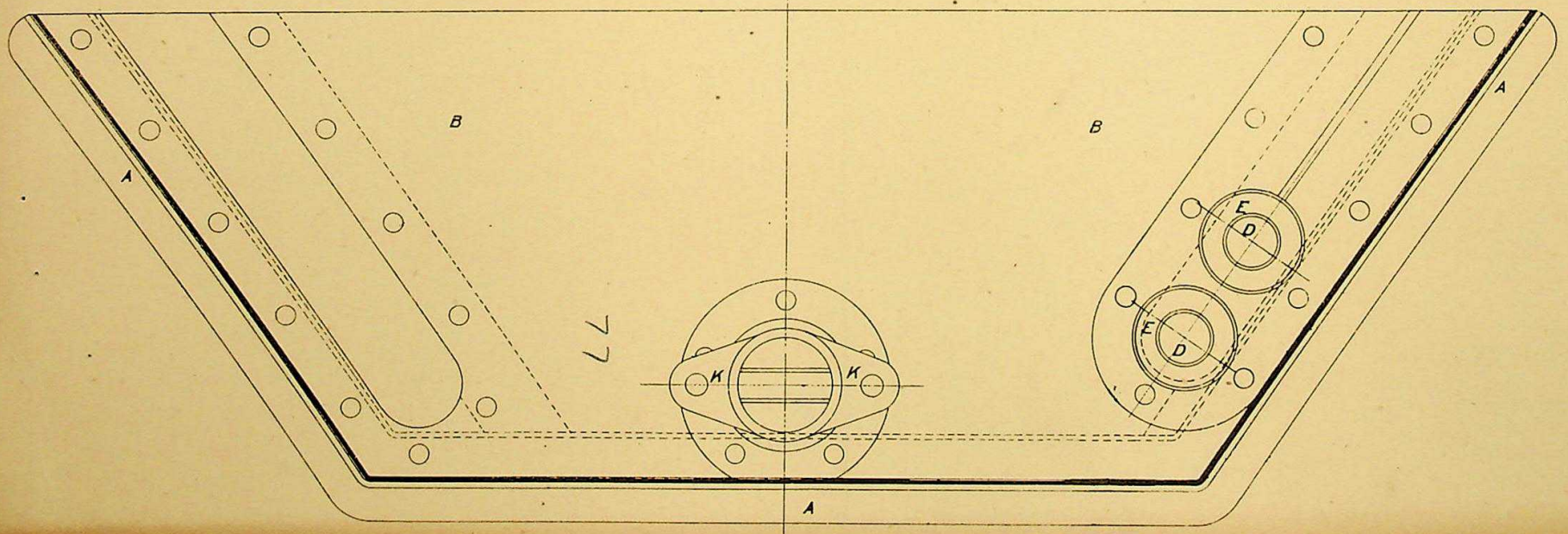


FIG. 8.



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HOCKING'S Specification.

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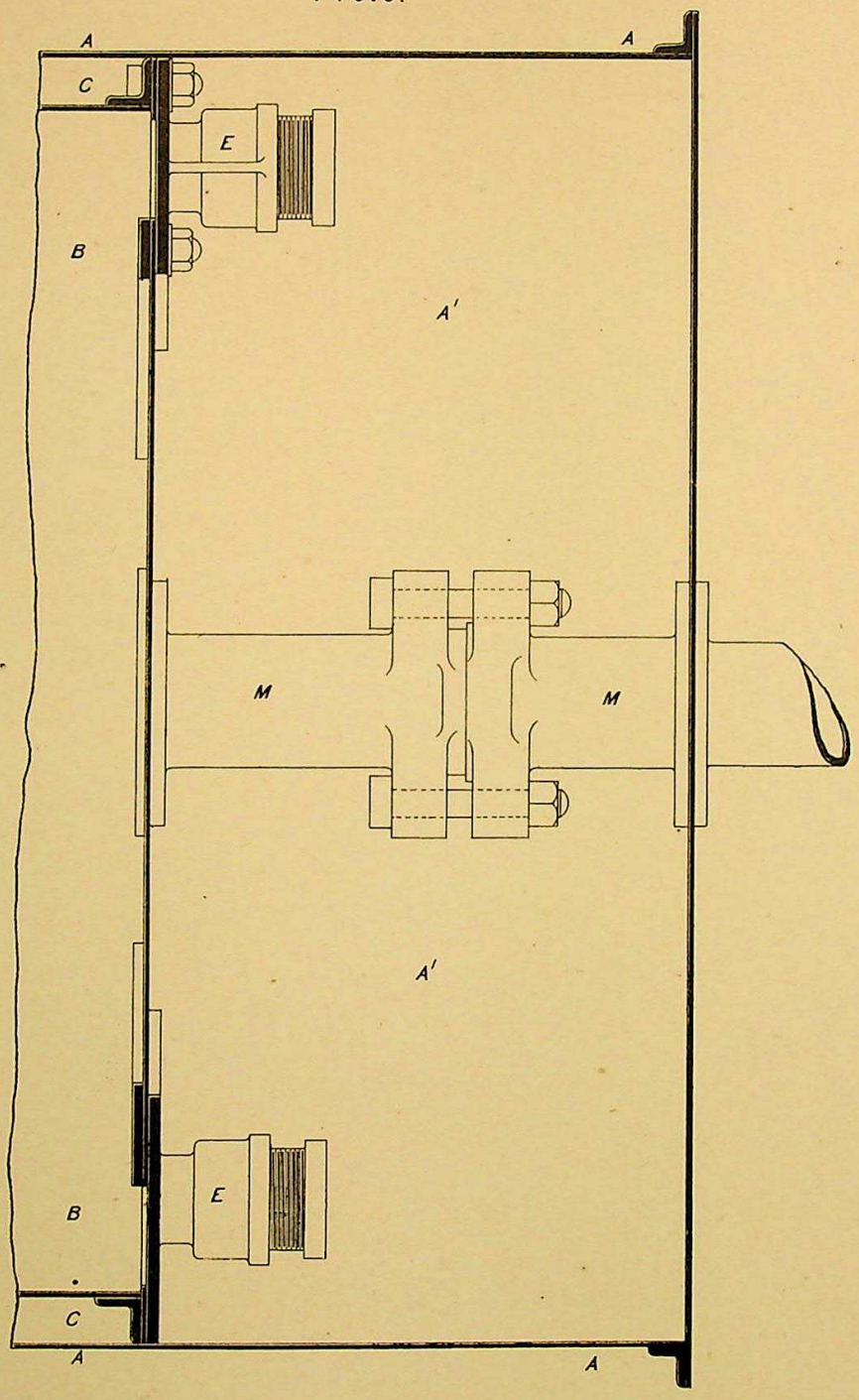
SHEET 4.

FIG. 9.



Malby & Sons, Photo-Litho.

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said Franklin Hocking in the Great Seal Patent Office on the 14th August 1880.

FRANKLIN HOCKING, of Liverpool, in the County of Lancaster. "IMPROVEMENTS IN AND RELATING TO APPARATUS FOR COOLING AND REFRIGERATING LIQUIDS."

This Invention relates to a novel form and construction of apparatus for cooling and refrigerating liquid, such as brewers' wort, and has for its object the construction of an apparatus that shall possess the following advantages:—Large cooling surface, small size in proportion to cooling surface obtained, perfect accessibility of parts for cleansing purposes, facility of repair, and adaptability as a cooler or as a refrigerator, and facility of duplication or extension if required.

An apparatus constructed according to this Invention consists of a vat or vessel with inclined sides, of size to contain one, two, or more of the hereafter described apparatus, which consists of a smaller vat, or vessel of like section, and placed inside the before referred to vat or vessel, so as to leave a space between the inner and outer vessels at their sides and bottom. The inner vessel is provided with horizontal pipes in number as required, say two on each side, placed one above the other, those on one side of the vat being intermediate with those on the other side. These pipes pass through stuffing boxes in the ends of the vessel and are free to turn therein. Attached to each pipe, communicating therewith and forming part thereof, there is, what I term, a hollow leaf chamber, which extends across the inner vat or vessel for the whole length thereof. These leaf chambers are formed of sheet metal, for example, copper brazed or rivetted to a brass frame and to the pipes to which they are attached. The leaf chambers are perforated and stayed with ferrules, and are, as will be understood, capable of being turned up as leaves on the respective sides of the vat or vessel by the pipes from which they emanate turning in the stuffing boxes. The pipes deliver into the leaf chambers through perforated lateral passages at one end of the leaf chambers, the discharge being through a similar passage at the other end of the leaf chambers.

As an example of an apparatus for cooling brewers' wort according to my Invention, two of the herein before described inner vessels may be placed end to end within an outer vessel, as described, the inner vessels communicating by a suitable pipe placed near the bottom thereof receiving the liquid to be cooled through a suitable pipe at the end of one vessel and discharging the liquid cooled through a suitable pipe at the end of the other vessel. The inner vessels being filled with the liquid to be cooled and the leaf chambers being laid in horizontal position in such liquid, and the outer vessel being kept supplied with a continuous stream of cold water, such cold water passes from the outer vessel through the pipes and through the leaf chambers, the cooling surface being the exterior surfaces of the leaf chambers and pipes and the interior surface of the vessel. Where it is required to increase the cooling properties of the apparatus, I place broken ice in the spaces formed between or at the ends of the inner vessels. After use each leaf chamber can be lifted from the horizontal to the perpendicular, thus exposing *ad seriatim* the entire surfaces of the leaf chambers, pipes, sides, bottom, and ends of the vessel, which thus can be got at and thoroughly cleaned.

It will be understood that an apparatus according to my Invention is capable of unlimited extension, as the vessels with the hinged leaf chambers can be repeated to any extent.

In order that my Invention may be fully understood I now proceed to more particularly describe the same, and for that purpose I shall refer to the several

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Hocking's Improvements in Apparatus for Cooling and Refrigerating Liquids.

Figures on the annexed four Sheets of Drawings, in which the same letters of reference are used to denote the same or corresponding parts throughout the Figures, and which also correspond with the letters and figures used in the following explanation :—

Figure 1 is an elevation of an apparatus constructed according to my Invention, shown partly in section.

Figure 2 is a plan of Figure 1.

Figure 3 is a section at A, Figure 2.

Figure 4 is an end view of Figure 2.

Figure 5 is an enlarged sectional view taken at B, Figure 2.

Figure 6 is a sectional plan of Figure 5.

Figure 7 is a sectional elevation at A, Figures 6 and 2.

Figure 8 is a sectional elevation at C, Figure 6.

Figure 9 is a sectional plan at D, Figure 1.

Upon reference to the Drawings it will be seen that an apparatus constructed according to my Invention consists of a vat or vessel A with inclined sides, and constructed of size to contain one, two, or more of the hereafter described apparatus, which consists of a smaller vat or vessel B, of like section to and placed inside the before referred to vat or vessel A, so as to leave a space C between the inner vessel B and outer vessel A at their sides and bottom. The inner vessel B is provided with horizontal pipes D, D^1, in number as required, say two on each side, as shown in the Drawings. The pipes are placed at the side of the vessel B thus, the pipes D on one side and the pipes D^1 on the other side coming one above the other on each side, and those on one side of the vessel being intermediately pitched with those on the other side. The pipes D, D^1, pass through the stuffing boxes E, E^1, in the respective ends of the vessel B and are free to turn therein. Attached to each pipe and communicating therewith there is, what I term, a hollow leaf chamber, indicated by the letter F for the pipes D, and F^1 for the pipes D^1. These leaf chambers F, F^1, extend across the inner vat or vessel B the whole length thereof, the chambers F being intermediate with the chambers F^1. The chambers are formed of sheet metal, for example, copper, brazed or rivetted to a brass frame and to the pipes to which they are attached (see detail, Figures 6 and 7). The chambers F, F^1, are perforated and stayed with ferrules as at G, Figure 7, and are capable of being turned up as leaves on the respective sides of the vat or vessel by the pipes D, D^1, from which they emanate, turning in the stuffing boxes E, E^1. The pipes D, D^1, deliver into the leaf chambers F, F^1, through the perforated lateral passages H at one end of the leaf chambers, the discharge being through a similar passage J at the other end of the leaf chamber.

As an example of an apparatus suitable to be used for cooling brewers' wort, and constructed according to my Invention, two of the inner vessels B may be placed end to end within an outer vessel A, as shown in the Drawings. The inner vessels B, B, are arranged so as to communicate by the pipe K placed near the bottom of the vessels. The liquid to be cooled is fed to one vessel B and is discharged from the other vessel B through the pipe M. The vessel A and the vessels B may be placed at a slight incline, as shown at Figure 1. The vessels B being filled with liquid to be cooled, and the leaf chambers F, F^1, being laid in horizontal position in such liquid, the outer vessel A is kept supplied with a continuous stream of cold water by a pump or otherwise through the pipe L, such cold water passes from the chamber A^1 tof the outer vessel and through the pipes D, D^1, and through the leaf chambers F, F^1, discharging into the chambers A^{11}, and thence through the pipes D, D^1, and the leaf chambers F, F^1, of the second vessel B, and afterwards to the chamber A^{111}, from which it is discharged, or overflows through the pipe N, the cooling surface being the exterior surface of the leaf chambers F, F^1, and pipes D, D^1, and the interior surface of the vessels B. Where it is required to increase the cooling properties of the apparatus, I place broken ice in the spaces or chambers A^1 and A^{11} or either of them through which the cooling water passes.

After use each leaf chamber F, F¹, can be raised, or swung in the stuffing boxes E, E¹, from the horizontal to the perpendicular position, as shown at Figure 3, thus exposing *ad seriatim* the entire surfaces of the leaf chambers F, F¹, pipes D, D¹, sides, bottom, and ends of vessels B, which can thus be got at and thoroughly cleaned. The vessels B may be provided with a raising cover P and, by preference, when made of copper or alloy thereof, or similar metal, the outer surfaces of the leaf chambers F, F¹, the pipes D, D¹, and the inner surface of the vessels B, and the pipes K, M, are thoroughly tinned.

Having now fully described my Invention and illustrated how the same may be put into practical operation, I would have it understood that I do not confine myself to the exact details or dimensions of the apparatus, as described and illustrated, as the same are capable of various modifications, but what I claim as my Invention and secured to me by the hereinbefore in part recited Letters Patent is,—

First. An apparatus for cooling and refrigerating liquids, consisting of an outer vessel or vat, such as A, in which is an inner vessel or vessels, such as B, provided with leaf chambers, such as F, F¹, as herein described and illustrated in the accompanying Drawings.

Second. In apparatus for cooling and refrigerating liquids, the use of lifting or swinging leaf chambers, such as F, F¹, through which the cooling water passes, as herein set forth and illustrated.

Third. The general construction and arrangement of apparatus for cooling and refrigerating liquids, as herein set forth and illustrated in the accompanying Drawings.

In witness whereof, I, the said Franklin Hocking, have hereunto set my hand and seal, this Eleventh day of August, in the year of our Lord One thousand eight hundred and eighty.

FRANKLIN (L.S.) HOCKING.

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1880.